

The examiner has rejected claims 11 and 30-48 under 35 U.S.C. 103(a) over Carbin et al. in view of Grazen and Hunt, and further in view of Ameen or O'Bryan. It is respectfully submitted that the rejection should be withdrawn.

The present invention relates to a multi-layer foil suitable for forming electrical resistors for inclusion in a printed circuit board. The inventive multi-layer foils comprise a copper metal layer having two opposite sides, one side having a shiny surface and the opposite side having a matte surface, and an electrically resistive composite material layer on the copper metal layer shiny surface wherein the electrically resistive composite material layer includes from about 0.01 to about 99.9 area % of nickel and from about 0.01 to about 99.9 area % of particles of alumina; which multi-layer foil is formed by codepositing the alumina and the nickel onto the copper metal layer shiny surface by electrodeposition and wherein the electrically resistive composite material has a resistivity of from about 1 to about 10,000 ohms/square; and a surface of said copper metal layer having been provided with a silane adhesion promoting treatment, said treated surface being between the copper metal layer and the electrically resistive composite material layer.

Carbin et al. describes a method for forming printed circuits by applying a roughened conductive metal layer onto a substrate. The Examiner asserts that Carbin discloses the claimed invention, but admits that Carbin et al. does not teach the conductors and nonconductors of the present claims. This reference neither describes nor suggests that a treatment to a surface of a copper foil is appropriate to improve the adhesion between said copper foil and a resistor which is a combination of metal and non-metal components. The examiner thus cites Grazen, Hunt and Ameen or O'Bryan in an attempt to fill the deficiencies of Carbin et al.

Grazen is cited for teaching codepositing the alumina and the nickel. Indeed, Grazen teaches the simultaneous electrodeposition of a metal and electrically inert additive particles. However, it is urged that one skilled in the art would not have been inspired to combine Grazen with Carbin and either of Ameen or O'Bryan in an effort to formulate

the present invention. Applicants have previously submitted that Grazen is non-analogous art to the field of the instant invention, since Grazen does not pertain to multilayered foils at all. Rather, Grazen pertains to protective coatings on tools and mechanical parts rather than resistors on multilayered foils. The examiner argues in response that Grazen is analogous art since certain materials in Grazen similar to those materials used in the circuits of the present invention. Applicants respectfully submit that this is not the case. It is urged that a mere showing these materials have been used in Grazen, for vastly different purposes, is not sufficient to show that one skilled in the art would have been inspired to seek the teachings of Grazen, relating to tools, in an effort to devise the presently claimed invention, relating to circuit boards. It is again submitted that Grazen is non-analogous art to the field of the instant invention, and there is no motivation in any of the cited references which would inspire one skilled in the art to combine Grazen with the other cited references in formulating the present invention.

With regard to Hunt et al., this reference teaches a method of depositing a resistive material onto an insulating surface. Hunt fails to teach a conductive metal layer having a surface which has been provided with a silane adhesion promoting treatment, as required by the present claims. Furthermore, nothing in Hunt et al. teaches or suggests the use of, or need for, adhesion promotion between the layers of their structure. The examiner asserts that since adhesion promotion is known in the art, it would have been obvious for one to use adhesion promotion where Hunt deposits a metal onto a substrate. It is respectfully submitted that this argument is unfounded.

Applicants urge that the examiner has not established a case of obviousness *per se*. "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." In re Geiger, 2 U.S.P.Q.2d 1276, 1278 (CAFC 1987). Such a showing is not present in Hunt. Nothing in Hunt et al. teaches or suggests the use of, or need for, adhesion promotion between the layers of their structure. The examiner previously asserted that Hunt's copper oxide treatment was an adhesion promoter. However, nothing in Hunt et al. states that the copper oxide layer *improves* or *promotes* adhesion.

The fact that Hunt teaches a multi-layered structure does not imply that any or all of these layers *could or should* be treated, as required by the present claims, to enhance adhesion. Thus, it is urged that the examiner is impermissibly reconstructing the art in light of Applicant's disclosure.

The examiner cites Ameen or O'Bryan in an effort to teach a silane adhesion promotion treatment. However, it is urged that one skilled in the art would not have been inspired to combine either of these references for this purpose with Carbin and Hunt, two references which do not require an adhesion promotion treatment. It is again urged that O'Bryan is not available as a reference against the present invention. Regarding Ameen, it is urged that there is no teaching or suggestion in the cited art which would lead one to combine Ameen with the above cited references. Ameen shows a silane treatment performed on a deposited chromium layer. There is no suggestion from Ameen that such a silane treated chromium layer should be attached to an adjacent electrically resistive composite material which comprises from about 0.01 to about 99.9 area % of a conductive material and from about 0.01 to about 99.0 area % of particles of non-conductive material. There is no suggestion that such an electrically resistive composite could or should be co-deposited onto a silane adhesion promoted surface.

There no suggestion from Ameen to perform a silane treatment to a copper surface, certainly not to a shiny side of a copper surface, nor is there a suggestion to attach a silane treated copper surface to electrically resistive composite material of from of nickel and particles of alumina; and more certainly not to an electrically resistive composite material which has a resistivity of from about 1 to about 10,000 ohms/square.

Applicants urge that the examiner's attempt to piece these references together is improper, and that the examiner is impermissibly reconstructing the art in light of the present disclosure. An invention cannot be deemed unpatentable merely because, in a hindsight attempt to reconstruct the invention, one can find elements of it in the art; it must be shown that the invention as a whole was obvious at the time the invention was made without knowledge of the claimed invention. When selective combination of prior

art references is needed to make an invention seem obvious, there must be something in the art to suggest that particular combination other than hindsight gleaned from the invention itself, something to suggest the desirability of the combination. Uniroyal, Inc. v. Rudkin-Wiley Corp., 5 U.S.P.Q.2d 1434, 1438 (CAFC 1988). Such a suggestion is absent in the cited references. Again, an invention cannot be deemed unpatentable merely because, in a hindsight attempt to reconstruct the invention, one can find elements of it in the art. However, there is nothing in any of the cited art which shows that the roughening taught by Ameen would or should be expected to be successful if used together with these cited references. Applicants therefore respectfully urge that the 35 U.S.C. 103 rejection should be withdrawn.

The examiner has further rejected claims 37-45 and 47-48 under 35 U.S.C. 103 over Carbin and Hunt, in further view of Ameen or O'Bryan. The arguments against Carbin and Hunt are repeated from above and apply equally here. Again, the arguments against Ameen are repeated from above, and it is urged that O'Bryan is not available as prior art against the present application. Thus, Applicants urge that this ground or rejection is improper and should be withdrawn.

The examiner has still further rejected claims 37-44 and 46-48 under 35 U.S.C. 103 over Carbin and Kakuhashi, in further view of Ameen or O'Bryan.

Again, Carbin does not teach the conductors and nonconductors of the present claims. Carbin et al. does not describe or suggest the use of a resistor which is a combination of a metal and a non-metal as a part of their described conductive laminates.

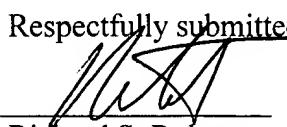
Regarding Kakuhashi, the examiner has agreed that this reference fails to disclose the *silane adhesion promoting treatment* of a surface of a conductive metal layer, as is required by the present claims. However, the examiner now attempts to fill this void of Kakuhashi by citing Ameen or O'Bryan. It is urged that there is nothing in any of the cited art which shows that the roughening taught by Ameen would or should be expected to be successful if used together with the teachings of Carbin or Kakuhashi. As stated

above, O'Bryan is not available as prior art against the present application. The arguments concerning Ameen or O'Brien are repeated from above.

The Examiner has presented no logical line of reasoning as to why the artist when viewing only the collective teachings of the references would have found it obvious to selectively pick and choose various elements and/or concepts from the combined references relied on to arrive at the claimed invention. The Examiner has done little more than cite references to show that one or more elements or some combinations thereof, when each is viewed in a vacuum is known. However, the claimed invention is directed to the combination of elements. The Examiner has also failed to provide a proper line of reasoning for why the one skilled in the art would have a reasonable expectation of success in forming the claimed combination of elements upon combining the above references. For these reasons, it is respectfully submitted that the claimed invention would not be obvious to one skilled in the art in view of the applied combination of references.

The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,



Richard S. Roberts
Reg. No. 27,941
P.O. Box 484
Princeton, New Jersey 08542
(609) 921-3500
Date: August 30, 2004

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, postage pre-paid in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on August 30, 2004.



Richard S. Roberts